

## ABSTRACT

Soil Water Content (SWC) is the amount of water contained in a volume of soil. It is important to measure SWC on agricultural land in order to obtain maximum results. These measurements will use a tool that is Ground Penetrating Radar (GPR). GPR is a device that utilizes electromagnetic high-frequency waves that can detect objects or elements that are below the ground surface. GPR transmits and receives electromagnetic waves by means of an antenna. The pyramid horn antenna is an Ultra Wide Band (UWB) type antenna that can be applied to GPR.

Pyramid horn antenna is a waveguide antenna that has a relatively large gain, causing the reception of electromagnetic waves to be more sensitive and accurate. However, it is necessary to adjust the dimensions of the antenna size, waveguide, and monopole as the power supply. This aims to get an antenna that has UWB criteria.

From these conditions, in this final project, a pyramidal horn antenna with a frequency range of 1-5 GHz is made which is used as an intermediary for sending and receiving electromagnetic waves in GPR. With a pyramidal horn-shaped exciter and rectangular waveguide, it is realized with a brass base with a thickness of 0.8 mm. The monopole also uses a brass rod with a diameter of 16 mm, a height of 35 mm and is located at 40 mm from the end of the waveguide. The measurement results obtained a bandwidth of 775 MHz, Return Loss -16,892 dB, VSWR 1.331, gain of 14,47 dBi with a unidirectional polaradiation, and ellipsis polarization. These results have match the UWB specifications.

Keyword : *Soil Water Content (SWC), Ground Penetrating Radar (GPR), pyramid horn antenna*